WHAT IS CLAIMED IS:

1. A magnetoresistive head, comprising:

a magnetoresistive film including first and second magnetization free layers, an intermediate layer sandwiched between the first and second magnetization free layers, an underlayer and a protective layer, which are stacked in the order of the underlayer, the first magnetization free layer, the intermediate layer, the second magnetization free layer and the protective layer and arranged to be substantially perpendicular to an air-bearing surface, each magnetization direction of which first and second magnetization free layers is allowed to vary independently in response to a signal magnetic flux from a medium, wherein first and second magnetization free layers produce a magnetoresistance effect in accordance with the magnetization directions thereof; and

a first electrode electrically connected with the underlayer and a second electrode electrically connected with the protective layer, the first and second electrodes allowing a current to flow in a direction substantially perpendicular to the plane of the magnetoresistive film.

2. The magnetoresistive head according to claim 1, further comprising a pair of magnetic shields arranged on both sides of structure of the first electrode, the magnetoresistive film and the second

electrode.

3. The magnetoresistive head according to claim 1, wherein each of the magnetic shields is in contact with the first electrode or with the second electrode.

4. The magnetoresistive head according to claim 1, wherein the intermediate layer is formed of a conductive nonmagnetic layer.

5. The magnetoresistive head according to claim 4, wherein the intermediate layer is formed of at least one kind of metal selected from the group consisting of Be, Al, Mg, Ca, Cu, Au, Ag, Rh, Ru and Ir.

6. The magnetoresistive head according to claim 1, wherein the intermediate layer is of a three-layered structure comprising a pair of first intermediate layers in contact with the first magnetization free layer and the second magnetization free layer, respectively, and a second intermediate layer interposed between the paired first intermediate layers.

7. The magnetoresistive head according to claim 6, wherein the first intermediate layer is formed of at least one kind of a metal selected from the group consisting of Cu, Au, Ag, Rh, Ru and Ir, and the second intermediate layer is formed of at least one kind of a metal selected from the group consisting of Be, Al, Mg

and Ca.

8. The magnetoresistive head according to claim 1, wherein the intermediate layer is formed of an oxide layer.

9. The magnetoresistive head according to claim 8, wherein the oxide layer is formed of at least one layer selected from the group consisting of an Al oxide, a Si oxide, a Fe oxide, a Cr oxide, a Ta oxide, a Ni oxide and a perovskite type oxide.

10. The magnetoresistive head according to claim 8, wherein the oxide layer has a thickness of about 5 nm or less.

11. The magnetoresistive head according to claim 1, wherein the intermediate layer is formed of a stacked film of [a metal layer/an oxide layer or nitride layer], or a sandwich film of [a metal layer/an oxide layer/a metal layer] or [a metal layer/a nitride layer/a metal layer].

12. The magnetoresistive head according to claim 11, wherein the oxide layer is formed of at least one layer selected from the group consisting of an Al oxide, a Si oxide, a Fe oxide, a perovskite type oxide, a Ta oxide, a Cr oxide, and a Ni oxide.

13. The magnetoresistive head according to claim 1, further comprising a pair of hard biasing films arranged on the both ends, along a track width direction, of the magnetoresistive film including the

first magnetization free layer, the intermediate layer and the second magnetization free layer, and imparting magnetic anisotropies to the first and second magnetization free layers in substantially the same direction.

14. The magnetoresistive head according to claim 1, further comprising:

a pair of first antiferromagnetic films arranged on the both ends of the first magnetization free layer along a track width direction so as to impart a magnetic anisotropy to the first magnetization free layer in a predetermined direction; and

a pair of second antiferromagnetic films arranged on the both ends of the second magnetization free layer along a track width direction so as to impart a magnetic anisotropy to the second magnetization free layer in a predetermined direction.

15. The magnetoresistive head according to claim 14, wherein the direction of the magnetic anisotropy imparted to the first magnetization free layer by the pair of first antiferromagnetic films and the direction of the magnetic anisotropy imparted to the second magnetization free layer by the pair of second antiferromagnetic films make an angle ranging from about 60° to 120° with each other.

16. The magnetoresistive head according to claim 14, wherein each of a distance between the pair

of first antiferromagnetic films and a distance between the pair of second antiferromagnetic films is about 0.5 μm or less.

17. The magnetoresistive head according to claim 16, wherein each of the distance between the pair of first antiferromagnetic films and the distance between the pair of second antiferromagnetic films is about 0.2 μm or less.

18. A perpendicular magnetic recording-reproducing apparatus, comprising:

a perpendicular magnetic recording medium; and

a magnetoresistive head according to claim 1 arranged to face the perpendicular magnetic recording medium.